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Plague Masks: The Visual Emergence of Anti-Epidemic Personal Protection Equipment

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ABSTRACT

Often described as “masks” face-worn devices are employed as personal protection equipment by health workers and the general public and considered to be an indispensable technology against epidemics. Simultaneously, they are potent symbols of existential risk. Could these material and visual aspects be more than simply indexically connected? In this article, I examine these apparatuses through a historical anthropological approach of their invention during the 1910–11 Manchurian plague outbreak. Arguing that they should be taken seriously as masks, I demonstrate that their emergence was rooted in their configuration as transformative agents of medical reason.

KEYWORDS

China; Manchuria; epidemic; mask; photography; plague

Assuming the form of a diagonal band spanning the interior of a white circle, a cotton facemask appears to be “stamped” on the cover of the Sunday magazine of Hong Kong’s leading journal, the *South China Morning Post*. On the murky blood-red background, behind this striking visual device we can read in alternating order, like a genetic sequence of doom, the ominous acronyms of three emerging infectious diseases: H7N9 (avian flu), SARS (Severe Acute Respiratory Syndrome), and MERS (Middle East Respiratory Syndrome). This peculiar visual assemblage functions as an epidemiologically inflected “STOP” sign. Printed in smaller letters under it, the cover title of the *Post Magazine*’s December 1, 2013 issue explains: “Stress and strains. Hong Kong’s never-ending fight against viruses.” The issue’s cover story, like similar feature articles that, in that same year, paid homage to Hong Kong’s SARS epidemic decennial, contains striking images. The majority portray individuals in different settings donning a range of face-worn personal protection equipment (PPEs): “a member of staff at the Beijing Centre for Disease Control put[ting] on a decontamination suit” (Lazarus 2013:11); a seven-year-old girl (the first H7N9 human case in Beijing) wearing a blue surgical mask while lying in a hospital bed with her toy bunny while an eerie figure donning goggles and a latex face-worn device faces the camera; “a haj pilgrim near Mecca, in Saudi Arabia wear[ing] a mask to avoid catching Mers [*sic*]” (21); five hooded, white overalls and goggle-wearing “health workers carry[ing] away bags containing dead chickens during a culling operation near Kathmandu” (21).¹ In relation to these images, the facemask sign on the front-page functions as an accumulative second-order signifier. Assembling and entangling emerging pathogens as an existential risk, it provides an essentially apotropaic promise of scientific control vis-à-vis the “next pandemic.”

In terms of remembering SARS and preparing Hong Kong’s population for what Laurie Garrett (1994) has coined the “coming plague,” the facemask in this publication thus appears to carry certain talismanic properties, allowing humanity to persist on the edge of a pandemic “end of the world.” At the same time, in the 15 years since the 2003 global outbreak, the use and efficacy of PPEs in epidemic control has become the subject of intense scientific debate. This has been especially so in the context of the recent Ebola outbreak, where the prophylactic efficacy and the transmission risk posed by PPE use has been

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examined (Casanova et al. 2016; MacIntyre et al. 2014; Reidy et al. 2017), but also in relation to airborne diseases like influenza (Bin-Reza et al. 2012; Brienens et al. 2010; Cowling et al. 2010), tuberculosis (Biscotto et al. 2005), and SARS (Syed et al. 2003). Equally prevalent has been a body of behavioral and social scientific studies of public perceptions and the social impact of anti-epidemic masks, or more generally masks employed to limit contagion in the context of epidemics (Chuang et al. 2015; Condon and Sinha 2010; Ferng et al. 2010; Koji, Kuniko, and Smith 2012; Lau et al. 2008; Ma et al. 2014; MacIntyre et al. 2009; Sin 2016).

Whether in relation to the actual protective potential of different face-worn devices, or in relation to their social and cultural impact, these studies have provided key insights into what is often considered to be both a first-line defence against airborne infection and a material object that makes visible limiting infection as a civic duty in the context of epidemic or pandemic threat. However, and indeed rather perplexingly, studies of anti-epidemic masks (or masks used in the context of epidemics) have largely unfolded in the absence of an examination of these devices precisely as what the term indicates: *masks*.

In this article, I raise and answer this neglected but anthropologically crucial question: Should anti-epidemic apparatuses covering one's face or facial orifices be treated as *masks* in a scientific setting, or should we pass over this denomination as simply conventional? In approaching the development and use of such face-worn technologies in epidemic contexts, should we engage at all with the corpus of anthropological literature on masking, or is it better to turn our back to it and seek tools for understanding this modern biomedical phenomenon from other ethnographic, semiotic, or social-theoretical spheres?

As objects of material culture and as components of bodily techniques, masks have played a crucial role in a wide range of societies across space and time. From Franz Boas and Marcel Mauss to Claude Lévi-Strauss and Alfred Gell, key anthropologists and anthropological schools have dedicated their attention to analyzing both masks in their particular ethnographic contexts and masking comparatively, as a practice spanning human societies and cultures. In spite of their often-stark differences, these approaches may be said to converge on a basic understanding of masks as objects and technologies that relate to identity, or more broadly personhood, and its transformation (Frontisi-Ducroux 1995; Pollock 1995). Whether the focus has been on how masks operate ritually in relation to inter-generational dynamics (e.g. Birch de Aguilar 1996), or how they mediate between the living and ancestors or animal spirits (e.g. Fienup-Riordan 1996; Oosten 1992), studies of masks and masking converge on the centrality of the semiotics and performativity of “categorical change” (Napier 1986:xxiii). A transformative potential that, as Elizabeth Tonkin (1979:240) has observed, is the result of an inversion, contradiction, or paradox introduced by the mask — conceived as a “mask-in-action” — and in particular by its principal physical operation: covering the human face. Already identified by Mauss, the faculty of revealing by hiding is central to what Tonkin coined the mask event, insofar as it “provide[s] a medium for exploring formal boundaries and a means of investigating the problems that appearances pose in the experience of change” (Napier 1986:xxiii).

Adopting this anthropological baseline as a comparative touchstone for discussing whether anti-epidemic face-worn PPEs should be taken seriously *as masks*, I proceed by examining the emergence of these personal protection devices in the context of the Manchurian pneumonic plague epidemic of 1910–11. Through this study, I show that this invention involved not only adopting face-worn devices aimed at halting infection as a bacteriologically understood process but also the transformation of these from mere cloths and fabrics around one's mouth and nose to mediums of a categorical transformation of their wearers into “reasoned” subjects of hygienic modernity (Rogaski 2004). I argue that the emergence of PPEs is entangled in a transformation of masks and their symbolic referents in the age of science — an irreducibly visual process that sets in place, if not necessarily the ritualization of epidemic control operations, a design-driven potential of subjectivation at the heart of modern technologies against contagion.

The emergence of the plague mask

The so-called great Manchurian plague epidemic broke out in the autumn of 1910 in the Chinese-Russian frontier town of Manzhouli and quickly spread south along the railroads to Harbin and other Manchurian cities where it caused crisis, with a case fatality rate of 100%. Manifested clinically in pneumonic form, and spread between humans in an airborne fashion, it pitched the Chinese, Japanese, and Russian Empires, which controlled different areas of Manchuria, in a protracted biopolitical and geopolitical struggle (Gamsa 2006; Lynteris 2016; Nathan 1967; Summers 2012).

In the midst of this crisis, which involved not only the three empires but also Foreign Legation doctors, missionaries, and an American medical delegation from the Philippines led by R. P. Strong, the Chinese imperial court appointed as the head of its anti-plague efforts the Penang-born, ethnically Chinese, and Cambridge-educated Wu Liande. Entangled in a struggle that involved the disease itself, local interests, imperial conflict, and wider aspects of social antagonism, Wu adopted the bold theory that the spread of the disease did not require non-human vectors (such as fleas), as rival Japanese scientists insisted, but was transmitted directly between humans in an airborne manner (Lei 2011) and was therefore contagious.

Though clinical observations of pneumonic cases of the disease had been in place since the first outbreaks of the third plague pandemic in Hong Kong and India 15 years earlier, the idea that plague could be airborne was novel and bore a destabilizing effect on the recently accepted theory that the disease spread mainly, if not uniquely, by rats and their fleas. Accompanying this explanation of the epidemic was the development and proliferation of an anti-epidemic technology that Wu actively propagated as his own, personal invention: the “anti-plague mask” (Figure 1). This resembled recently established surgical face-worn protective devices (usually dated back to 1897; Spooner 1967) but generally involved more protective layers and a more complex tying process, designed to keep the mask in place while operating in the adverse open-air conditions of winter-time Manchuria:

This consists of two layers of gauze enclosing a flat oblong piece of absorbent cotton 6 inches by 4 inches. It can be easily made by cutting the usual surgical gauze (9 inches wide), as supplied from the shops, into strips, each measuring 3 feet in length. Each strip is then doubled lengthwise so as to contain in the middle a flat piece of cotton wool measuring 4 inches by 6 inches. At either end of the gauze two cuts, each measuring 15 inches, are made. Thus turning the pad into a three-tail gauze bandage, with the central piece of wool for covering the respiratory entrance. The upper tail of one side should be passed round the side of the head above the ear and tied to the other corresponding tail. The lowermost tail should in a similar manner be passed under the ear and tied to the one on the other side, while the middle tail should be passed over the crown of the head, so as to fix the pad and prevent it from slipping down the neck (Wu 1926, 393–394).

The aim was for this device to be worn by doctors and other medical or paramedical staff, operating in diverse contexts such as plague hospitals, the open-air cremation of plague corpses, and the work of removing, guarding, and examining plague contacts. It was also meant to be worn by patients, contacts, and, to the extent that this was possible, by the entire affected population. This was the first time that such an epidemic containment measure was attempted, matched only by similar efforts across the globe during the 1918 influenza pandemic (Luckingham 1984; Tomes 2010).²

Wu’s airborne contagion theory did not remain uncontested. In his later, heroically inflected autobiography, he provided a villainous icon of medical resistance to his airborne transmission theory and the anti-plague mask in the form of Dr. Gérald Mesny, a French physician with previous working experience with plague. Writing in the third person, Wu narrated their confrontation:

Dr. Wu was seated in a large padded armchair, trying to smile away their differences. The Frenchman was excited, and kept on walking to and fro in the heated room. Suddenly, unable to contain himself any longer, he faced Dr. Wu, raised both his arms in a threatening manner, and with bulging eyes cried out ‘You, you Chinaman, how dare you laugh at me and contradict your superior?’ (Wu 1959: 19).

According to this “outbreak narrative” (Wald 2008), Mesny went off to operate in plague hospitals without wearing Wu’s mask. As a result, he contracted the disease and died a few days later, thus



Figure 1. “Wearing anti-plague masks, front and side views”, Manchurian Plague Prevention Service (Harbin), Early photos of pneumonic plague epidemics, 1910-11 and 1920-21, Manchuria [U 614.42518 M26 e], Courtesy of The University of Hong Kong Libraries.

leading to a universal adoption of Wu’s theory and its accompanying prophylactic apparatus: “almost everyone in the streets was seen to wear one form of mask or another” (Wu 1959:22).

We should be careful here to treat this story not as historical evidence but as part of the constitutive mythology of the particular anti-epidemic personal protection device *as a mask*. For Wu, the latter played a crucial role both in epidemic control but perhaps even more importantly in checking the medico-juridical ambitions of his rivals. During the April 1911 International Plague Conference in Mukden, where conflicting theories about the nature of the disease and the manner of halting the epidemic were to be discussed — effectively deciding which empire was modern enough to rule Manchuria — Wu presented international delegates with a carefully crafted photographic album titled *Views of Harbin (Fuchiatien) Taken During the Plague Epidemic, December 1910 - March 1911* (Wu 1911).

Views of Harbin

Containing 61 images, each occupying a single page, with captions in English and in Chinese, the album rivalled similar photographic productions by the Russians and the Japanese. Wu’s album assumed an impressive visual technique: beginning with a series of birds-eye views of Harbin, the camera then appears to plunge deeper and deeper into the afflicted city, with panoramic views giving way to the dark claustrophobic image of the proverbial innards of its coolie neighborhood, Fujiadian (Romanized as *Fuchiatien* at the time). The album then proceeds by depicting anti-plague efforts of the Chinese under Wu: cremation, isolation, laboratory work, statistical calculations, house-to-house inspections, quarantining contacts, disinfection, ambulatory assistance, aid to the poor, and most strikingly burning down the supposed breeding grounds of plague.

Throughout the album, such is the prominence of masks that we may claim it is these rather than any single event, measure, social group or person, which are set center stage in Wu’s photographic narrative. From a total of 61 photographs, out of which 47 depict humans, 32 are photos of masked men (all are male). More than 230 individuals wearing anti-epidemic masks can be seen in total,

invariably posing before the camera, often in large, closely clustered groups. Rather than being hidden by their masks, this legion of “plague-fighters” (Wu 1959) stands revealed by them. For in the sepia photographic reproduction of the album, the white color of the masks creates a striking ground-figure effect: whereas individuals not wearing masks (mostly contacts in or heading for quarantine) tend to fuse with the surrounding urban landscape, the white contour of the mask creates a strong contrast that renders Wu’s anti-epidemic army all the more visible. From burial coolies up to distinguished doctors, nearly all staff under Wu appears to be wearing the mask, creating a visual contrast that accentuates the sense of a united front against the disease.

This spectacle of masked unity is realized both in individual photos and across them in the album. For example, Photo 23, “Staff of Section III,” depicts two rows of mask-wearing anti-plague fighters: the front row is of doctors and their assistants (wearing lab-coats), while the back row includes “coolies” and cart drivers (the former in overalls) (Figure 2). Similarly, Photo 27, “Staff of Section IV,” depicts three rows of mask-clad men: a front row of mask and lab-coat wearing doctors and assistants, a second row of mask and uniform wearing policemen, and a third row of mask and overalls wearing coolies, some of whom are mounted on a burial cart or ambulance.

While obscuring the deeply entrenched mistrust between the different classes and professions depicted and its practical manifestation in the course of undertaking epidemic control, this spectacle of white-masked unity also underlined the contrast between Wu’s hygienic model army and the social “background” on which its image was drawn: the supposed backwardness of victims and contacts metonymically exemplified in the depiction of squalor in the streets of Fujiadian. This visual pattern



Figure 2. “Staff of Section III. Doctors and Assistants in front, coolies and carts behind”, Wu (1911). Courtesy of The Needham Research Institute.

rhymed with Wu's overall strategy of accusing migrant "coolies" (especially from Shandong Province) as responsible for the transmission of plague from its original reservoir (the Siberian marmot) to humans, and for the spread of the disease between humans in a three-fold manner: first inside the sunless, underground coolie hovels of marmot-hunting hubs like Manzhouli, then in crammed third-class railway wagons headed south, and finally in equally dark and crowded coolie slums like Fujiadian (Lynteris 2016). Rather than simply being illustrative, Wu's epidemic photography accomplished a visual architecture of class-derived pathogeny, which in turn bolstered Chinese sovereignty in Manchuria. This absolved China's ruling classes from responsibility regarding the epidemic disaster while putting the blame onto an anthropological type already held by international players in the Manchurian theater to be responsible for the generation and spread of disease: coolies.

In achieving this epidemic vision, Wu mobilized tropes that had already been developed in the photographic configuration of plague across the globe since the eruption of the initial outbreak of the third pandemic in Hong Kong (1894). Most importantly, the visual contrast between white-masked "plague fighters" and dark shanty towns rhymed emphatically with photos taken by David Knox Griffith of the Shropshire Regiment's "Whitewash Brigade" evacuating Chinese working-class homes and "cleansing" Hong Kong's Taipingshan neighborhood by burning supposedly infectious material out in the streets (Peckham 2016; Platt, Jones, and Platt 1998). This handful of photos, where white-uniformed and white-helmeted British soldiers are depicted as a force of purification, had become iconic in their multiple reproductions (both photographic and lithographic) in the daily press across the globe (see Peckham 2016). As Robert Peckham notes, the racial symbolism of these photographs and their "color-coding" was central to the outbreak narrative that they helped institute:

(T)he 'white' volunteers in the composition are pitted against the threat of the 'black death' that seeps from the native homes. This black-and-white iconography of disease echoes news reports from the 1890s that envisioned the battle against pathogens as a bitter frontier-conflict fought between white troops and black bacterial natives (Peckham [Forthcoming](#)).³

The 1894 Hong Kong plague photographs visualized epidemic control as a civilizational and racial war against the supposedly irreducible link between germs and Chinese backwardness. Wu employed this British colonial visual trope to depict his anti-plague operations 17 years later in Manchuria. Thus, he attempted to demonstrate how the Chinese were now able to fight effectively against this link themselves insofar as it was a link pertaining not to race, as colonial forces had maintained, but to class instead.

We must then conclude that in this album, Wu did not simply use the mask as a prop to draw a portrait of the epidemic after the latter's causes and mode of combat had already been decided. Instead, he rendered anti-epidemic masks into an organizing principle of his field of vision, as a vision of state-organized medical reason and hygienic modernity. In this sense, it may be argued that the change in the structure of the experience of the epidemic brought about by Wu's photographic depiction of the mask was catalytic in both sustaining Chinese sovereignty over Manchuria and ushering in the age of biopolitics in China. That is, insofar as — to remember Agamben's commentary on the presence of two beaked plague doctors on the cover illustration of Hobbes' *Leviathan* — the definition of the plague as the mother of anomy (a catalyst of Western political thought since Thucydides) equates not only treatment with governance but also, and perhaps more pertinently, containment with the constitution of a national body politic (Agamben 2016).⁴

Reasoned transformation

While Wu was a vocal proponent of the airborne theory and the mask designed to halt this form of contagion, he was far from alone in making these claims or in developing such technologies. As with other emerging sanitary and biomedical technologies at the turn of the twentieth century, such as disinfection machines (Mooney 2015), the anti-plague mask arose within an entangled contest of competing design practices, epidemiological theories, and utopian projects of hygienic modernity. In the course of the Mukden plague conference, Dr. Fang displayed "over ten varieties of masks from different sources" used

in Fujiadian during the epidemic (Fang 1912:287). Unfortunately, no images of these masks as presented by Fang survive. Still a visual record of different face-worn devices in use during the epidemic may be assembled from various Chinese, Russian, Japanese, American, and French textual and visual sources. These included the so-called “Mukden mask” and “Broquet’s mask.” The first was used widely in the Japanese-controlled areas in South Manchuria and “consisted of a pad of absorbent cotton about 16 by 12 centimetres and about 1.5 centimetres thick; this was wrapped in gauze, the ends of which were tied at the back of the head . . . A many-tailed bandage . . . composed of three layers was tied around the entire head and served to press the mask firmly against the face and keep it snugly in place for hours at a time” (Barber and Teague 1912:244).⁵ The second was developed by the homonymous French doctor, a Pasteurian with long experience with plague in the South of China. Broquet initially designed a device “inspired by the costume of a quarantine doctor of 1819” (Broquet 1911:64) (in later publications misrepresented as a medieval one; Hendrick 1914), but he found it impracticable and so constructed a visually striking prophylactic apparatus consisting of a mica hood, covering the entire face, fitted with driver’s goggles and a single-strapped gauze-and-cotton mask. However, as can be ascertained by R. P. Strong’s report on the Mukden conference, Wu’s simple device was widely accepted as the most efficient (Strong 1912:465).

It is hard to estimate the extent to which any of these face-worn devices were adopted by medical staff or the general population. From the little evidence we have, it appears that their adoption often involved unconventional processes, such as the one employed in Chefoo (as the name of German-controlled Zhifu, today known as Yantai, in China’s Shandong Province, was commonly Romanized) where they were stamped with temple seals, effectively rendering them into amulets (in Strong 1912:303). According to Barber and Teague, elaborate experiments conducted on the “Mukden masks” with *Serratia marcescens* (at the time known as *Bacillus prodigiosus*) in the bacteriological laboratory of the Bureau of Science in Manila proved not only that they did not properly fit the wearer’s face but that they also allowed bacteria to penetrate: “Their use in the recent epidemic of pneumonic plague in Manchuria lent a *false* sense of security which may have led to the taking of unnecessary risks” (Barber and Teague 1912:268).⁶

Yet perhaps the Mesny anecdote and Wu’s photographic spectacle tells us more about these devices than the true history of their emergence, insofar as they are able to offer us a glimpse of their *unintentional truth* (Buck-Morss 1977). To understand the emergence of the facemask as an anti-epidemic technology and its continuing impact today, we need to take its imagined origins seriously, in the same way in which, for example, we consider the Kwakiutl myth of the creation of their masks as a result of “the original ancestors shed[ing] their skins and emerg[ing] as human beings,” with the skins “bec[oming] the masks later associated with the name of the ancestors” (Pollock 1995:586). Only then can we begin to see how, while being a practical, and in some cases effective, prophylactic technology, its material application has always already been tied to a symbolic function, which we should more precisely classify as mythic. This function, I would like to claim, renders these devices into *masks*, in the proper sense of the term.

In examining this anti-epidemic apparatus from an anthropological perspective, it immediately becomes obvious that a *representational* focus is inadequate in grasping what it does in the social, rather than simply bodily, milieu in which it operates. By contrast to the vast majority of masks studied by anthropologists, these devices are not anthropomorphic, zoomorphic, or theriomorphic. In other words, they do not assume, mimic, or configure the physical features of an entity other than their wearer, the alternate-identity or properties of whom the latter, be that individual or in some cases collective, is meant to assume, mimic, tame, or master. Yet, if anti-epidemic face-worn devices are non-representational, they are still implicated, like masks studied by anthropologists, in the invocation, embodiment, and manipulation of a force: in this case, *reason*.

I suggest here that we need to approach the emergent anti-epidemic mask of the Manchurian outbreak as a dialectical image, in other words, as something which, in Walter Benjamin’s sense, operates as a “switch” in so far as it “arrests fleeting phenomena” and “sets reified objects in motion” (Buck-Morss 1977:106). It may be worth remembering here the critical-theoretical premise of reversibility, according to which the production of rationalism is, to use Bruce Kapferer’s useful turn of phrase, “instrumental in generating the supposed irrationalism that it encounter[s] and often f[ights] to control” (2007:86). In other words, what I propose is that in approaching this anti-epidemic prophylactic device in its historical and ethnographic

moment of emergence as an icon of an *agonistic medical rationalism*, we may be able to decipher how “in its very modernity and mundaneness, [it] conjured up the archaic and the exotic, the primitive and the mythic” (Taussig 1989:12). This was an apparatus that did not simply protect its wearers from infection. It also immersed them and their immediate social environment into a performance of medical reason and hygienic modernity. Its efficacy relied on conjuring up an imagined past: the past of the gradual adoption and rationalization of such personal protection equipment, mainly in the context of Europe’s long struggle against bubonic plague.

Mythic origins

It is common today to see images of contemporary PPEs, such as used, for example, in the context of the Ebola epidemic in West Africa, flanked by images of the early-modern “plague doctor” in his characteristic costume and beaked mask (often misrepresented as “Black Death” or medieval medical devices; e.g., British Medical Journal 1898; The Lancet 1927). This prolific popular-science visual trope invokes the latter as the progenitor of costumes worn in the process of stamping out Ebola and other emerging pathogens. What this popular culture idiom may lead us to overlook, however, is that this pedigree of anti-epidemic PPEs was already part of their emergence at the turn of the century. This pervasive mytho-history was linked to the idea that plague in general was discernible by the triptych of axillary, inguinal, and cervical buboes but that the Black Death (1346–1353), as the prototypical “pandemic” (a term used for the first time systematically only in the late nineteenth century; Harrison 2017), was pneumonic in character. The notion relied not only on an interpretive emphasis on historical tracts mentioning pneumonic symptoms but also on the interpretation of retrospective Renaissance “plague” paintings bearing the motif of people approaching victims while holding a presumably scented handkerchief on their mouth and nose (see Poussin’s *The Plague of Ashdod*, on which more details are provided below).⁷

In his account of the “history of the mask” written as part of his authoritative monograph on pneumonic plague for the League of Nations in 1926, Wu Liande attempted to frame his invention as the final stage of a painstakingly slow progress of personal plague prophylaxis, which included Charles de l’Orme’s seventeenth-century invention, the *medico della peste* mask and costume — the famous beaked plague doctor. A physician at Louis XIII’s court, following the memoirs of Michel de Saint-Martin, De l’Orme constructed the costume in the course of the 1619 plague outbreak in Paris out of saffian (sheepskin or goatskin) with the ears and nose of the bespectacled mask (also made of saffian) containing garlic and rue so that the “bad air” may find it difficult to penetrate and inflict the practicing doctor with plague (Blanchard 1900).⁸ If Wu was quick to jump from this iconic figure to late-nineteenth-century devices, other authors, like Broquet (1911), would discern the “continuation” of the plague mask via a number visual sources, like de Troy’s “la peste en Marseilles 1720” or Micco Spadaro’s scene of *The Piazza Mercatello* in Naples during the plague of 1656, where four masked men were said to be among the pestiferous multitude.⁹

This narrative traced the slow but unstoppable march of medical reason, from recognition to recognition, from illumination to illumination, so that even though the etiological framework involved in such practices was recognized as fundamentally false, the practice itself was seen as containing the seeds of reason as an unalienable trait of humanity. According to this iconographically reliant timeline, similar applications of anti-plague masks can be seen through the nineteenth century in such instances as the gravure depicting the costume of a physician at the Marseilles Lazaretto in 1819 contained in Antoine Barthélemy Clot-Bey’s 1840 book on plague in Egypt (1840) — Broquet’s original inspiration for his own “mask” experiments.¹⁰

We should pause here to consider this example in greater detail, on account of a striking discrepancy between Clot-Bey’s reception of the particular costume and early-twentieth-century citations of it as a progenitor of the Manchurian anti-plague mask (Broquet 1911). In Clot-Bey’s text, the French doctor paints a bleak picture of the costume in view (Figure 3). Clad in clogs, oilcloth gloves, and waxed linen garments, the apparatus — which the doctor notes has little changed

from the “grotesque” 1720 beaked plague doctor — even bore a stick for approaching the sick (Clot-Bey 1840:425). In the eyes of Clot-Bey, this was not simply ridiculous, but potentially harmful:

Think of the effect to be produced on a sick mind, a fainthearted brain, by the appearance of a ghost-like figure – when, in this very costume, the unfortunate sees the surgeon who is about to operate, what can he see in the man who should comfort him, other than a subject of horror and terror? (389, my translation)



Figure 3. Plague doctor's costume: “Costume d'un chirurgien quarantenaire du Lazaret de Marseille, en 1819”, originally appearing in Clot-Bey (1840). Courtesy of The Wellcome Collection.

We should read this passage not simply as a poetic evocation of the force of fear, but epistemologically. That is to say, in relation to the pervasive understanding, at the time, of the imagination as a *cause* of plague. As shown by Barker (2004:661), this idea was established during the Renaissance, and, in the words of the pesthouses' general commissioner during Rome's 1656 plague, Geronimo Gastaldi, "the imagination merely frightened by the plague is enough to bring on the disease."¹¹ Such concerns about the pathogenic, fear-inducing imagination of plague, and about human types susceptible to it, had been endorsed in the course of the seventeenth century by authorities like Athanasius Kircher and were intricately linked to humoral and Paracelsian understandings of the human body. As shown by Barker (2004), they played a key role in the development of a visual culture of plague at the time, with paintings such as Poussin's *Plague of Ashdod* (1630–31) operating not merely as representations of the disease but as prophylactic devices that, through a process of mimetic purging, redirected "feelings of fear and pity onto a work of art structured according to the poetics of tragedy, so that ensuing tragic catharsis can provide an artificial — and harmless — outlet for these emotions" (668). This framework was still in operation at the turn of the eighteenth century, and in Napoleonic medicine in particular. This is clear in Grisby's analysis of Antoine-Jean Gros's vast painting *Bonaparte Visiting the Plague Victims of Jaffa* (Les Pestiférés de Jaffa, 1804), depicting Napoleon meeting French soldiers, victims to bubonic plague, in a mosque that had been converted into a hospital. Rather than the painting embodying a Blochean moment of a *roi thaumaturge* and his healing touch, Grigsby (1995) argues, Napoleon's gesture of touching the axillary bubo of one of his infected soldiers was meant to both prove that the disease was not contagious and to cast away fear *as the cause of plague*. Emmanuel Comte de Las Cases' recounting of Napoleon's discussion of the event is illuminating: "The principal seat of the plague was in the imagination. During the Egyptian Campaign all those whose imagination was struck by fear died of it. The surest protection, the most efficacious remedy, was moral courage" (in Grigsby 1995:9).

Devices or gestures of protection by means of covering one's nose and mouth are never too far from this outbreak narrative. In the painting, we see one man holding his handkerchief against his nose, in the trope established in the seventeenth century by Nicholas Poussin: this is Marshal Jean-Batiste Bessières, whose gesture and accompanying expression of terror was intended by Gros as a personal, pictorial revenge against his old friend turned enemy (Hibbot 1969). Clot-Bey's treatise was dedicated to the experimental replication of a key historical event connected with Napoleonic perceptions of plague and the subject of various paintings and etchings. This was the self-inoculation of Napoleon Bonaparte's chief military doctor in the Egyptian Campaign, René-Nicolas Dufriche Desegnettes, with puss from axillary buboes of plague victims, a feat meant to prove that plague is not contagious.¹² If, in the Manchurian context the costume accompanying Clot-Bey's volume functioned as a model for or progenitor of their own anti-plague masks, within its original reference framework, that very costume was seen as the potential *cause* of the disease, not its prophylaxis.

My purpose here is not to debunk the genealogy of the anti-contagion mask as developed in the course of its emergence in 1910–1911. Instead, I wish to underline that the configuration of this apparatus as a *mask of reason* was predicated upon the redefinition of what pertains to reason and what not. If it could defend doctors and the general population from plague, this was possible only because it both stopped germs from entering the human body and transformed the public from a superstitious and ignorant mass into an enlightened hygienic-minded population: a population that accepted the contagious nature of the disease and corresponding, often brutal, quarantine and isolation measures.

Designed to bring about a transformation, not simply in the individuals wearing it but also in the society embracing it and its principles as a whole, the personal protection apparatus would then be properly speaking a *mask*: it did not only block germs but also catalyzed a passage from one mode of being into another, from unreason to reason.

Hence, the profanation effect experienced in Chefoo where coolies transformed masks into amulets, by stamping them with a temple seal (Strong 1912:303). This practice, like other instances such as using carbolic acid disinfectant in ritual exorcisms against plague demons (Kinnear 1902), was seen as a mockery of medical science's tools of reason. Cancelling out the transformative effect of the apparatus

— its mask-effect — such acts reduced it to a simple cloth around one's mouth and nose. This was, in fact, far less than the cloth held against one's nostrils by Poussin's plague-stricken denizens of Ashdod or wrapped around the face of burial workers in Michel Serre's *Scène de La peste de 1720 à La Tourette (Marseille)*. For while in the latter cases, reason was latent in the practice, in the coolies' abominable ritualization, the practice cancelled reason itself.¹³

Reaching out to ongoing anthropological debates on medical and sanitary devices, I suggest that the Chefoo incident demonstrates how in its emergence this epidemic-control technology contained what in Peter Redfield's sense (2016) we can call the practical promises of safeguarding health. Yet, at the same time, it also contained much broader, utopian promises of an anthropological transformation: a transformation that rendered the relation between practical promise and utopian hope both generative and hierarchical. Whether or not we want to consider these devices as sanitary/biomedical "gadgets" (or as part of the prehistory of the latter), this portable anti-epidemic technology embodied a simple, easily reproducible, and malleable design that operated on three interlinked levels as: (1) a supposedly foolproof way of halting airborne plague-related contagion; (2) an indisputable, photogenic, proof of Chinese scientific sovereignty; and (3) a visual and material mediator-transformer of the Chinese people into a population in the biopolitical sense of the term. While each of the three aspects was fundamental to the emergence of this epidemic technology, only the relation, or the *economy* (Agamben 2009), between them instituted it as an apparatus that allowed it to operate as a mask. Subtracting one of these aspects, as in the case of Chefoo, threatened to reduce it to a protective device, devoid of its political, mythic, and broader performative capacities.

Conclusion

Not just an index but also a catalyst of hygienic modernity, the anti-epidemic mask emerged in the context of the 1910–11 Manchurian plague epidemic not simply as an image of reason but also as an elaboration of humanity as being-for-reason (to paraphrase Gell 1975:301). More than one hundred years since its emergence, the device remains, in its most basic mass-produced and frequently used form, materially and visually largely unchanged. The question arises: does it also continue to operate as a mask?

This question is best answered ethnographically according to its application in cases such as SARS in Hong Kong or mainland China, Ebola in different West African settings, or influenza in its expected sites of emergence across the globe. Mediatic employments of PPEs, like the one with which this paper was introduced, indicate a lingering potential. PPEs occupy a precarious but fecund position between being tools, icons, and thresholds of humanity's wavering (if not altogether forlorn) self-realization in reason and its scientifically driven fight against invisible forces of existential risk. And by doing so, these devices are constantly reinvented *as masks*: as apparatuses of categorical transformation aimed at allowing humanity to persist at the brink of the end of the world as this is embodied by the spectre of the "next pandemic." Portrayed as the last barrier between us and the killer virus to come, "plague masks" ultimately transform us into a species inhabiting the anteroom of its own extinction.

Notes

1. Available online: <http://www.scmp.com/magazines/post-magazine/article/1367769/germ-warfare-hong-kongs-never-ending-fight-against-viruses>.
2. During the second pneumonic plague epidemic in Manchuria (1920–21), Wu Liande, as chief of the North Manchurian Plague Prevention Service, would oversee the production of distribution of 60,000 masks to the general population (Wu 1921).
3. I thank Robert Peckham for his permission to use this quote from his forthcoming work.
4. As Ginzburg (2017:57) has argued, the inclusion of the beaked doctors in *Leviathan's* cover should be read in tandem with Hobbes' idiosyncratic translation of Thucydides' passages on the "plague" of Athens in the course of the Peloponnesian War (430 BCE), especially the ones where the disease is depicted as "the solvent of all the city's social bonds." There, by depicting anomy as the result of a lack not of "restraint" (*apeirgein* in the Greek

original) but of “awe” before the gods and the laws of humans, Hobbes situated fear as the foundation of the State. For a discussion of the plague doctor figures in *Leviathan*’s cover and the relation between sovereignty and sanitation, see also Falk (2011).

5. Document supplied by the UAB Archives, University of Alabama at Birmingham, Series/Collection MC12, Folder 1.14. With thanks to Timothy Lee Pennycuff for his help in locating and accessing these sources.
6. Doubts regarding the efficacy of the masks continued to haunt their application both in the course of the 1918 influenza pandemic and in the context of later plague outbreaks in China. I thank Freddie Stephenson for bringing to my attention historical material attesting to the latter.
7. This practice was replicated by British soldiers involved in anti-plague work in 1894 Hong Kong, with handkerchiefs soaked in carbolic acid being pressed against their nose and mouth as they operated in the city (Peckham 2016).
8. A century later, in the Swiss physician and alchemist Jean Jacques Manget’s 1720 treatise on plague, a costume resembling that of De l’Orme’s appears in a famous etching of the plague doctor (Blanchard 1900).
9. Melchior Fuesslinus’ image of a 1720 plague doctor in Marseilles was suspected by early-twentieth-century plague experts like Broquet to be no more than a German caricature.
10. On Clot-Bey, see La Rue (2016).
11. On other aspects of plague’s relation to fear in early modern times, see Jane Stevens Crawshaw’s (2017) analysis of Antero Maria da San Bonaventura’s 1658 writings on quarantine.
12. On Napoleonic medicine, the Egyptian Campaign and plague see: Russell and Russell (2003), Hutin (2012) and Kelly (2010). Examples of such visual art as well as of Desegnettes in Jaffa include: Pierre Antoine Augustin Vafflard’s *Desegnettes, médecin en chef de l’armée d’Egypte, s’inocule La peste en présence Des soldats malades afin de calmer leur imagination* (date unknown), and Jean Sorieul’s *The Doctor In Chief Desegnettes With Plague Victims Of Jaffa*. A modern mural by Jean Coquet (1946) adorns the hall of L’Hôpital Desegnettes in Lyon.
13. The incident also underlined in the eyes of medical modernizers that “coolies’ were not simply unskilled or degenerate, they were culturally contagious: their touch was imagined as exercising a degenerative power on the very means employed for the hygienic modernization of China” (Lynteris 2016:315).

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References

- Agamben, G.
 2009 What is an Apparatus and Other Essays. D. Kishik and S. Pedatella, trans. Stanford, CA: Stanford University Press.
- 2016 Stasis. Civil War as a Political Paradigm. N. Heron, trans. Stanford, CA: Stanford University Press.
- Barber, M. A. and O. Teague
 1912 Studies on Pneumonic Plague and Plague Immunization, XII. *In* Some Experiments to Determine the Efficacy of Various Masks for Protection against Pneumonic Plague. Manila, The Philippines: Bureau of Printing.
- Barker, S.
 2004 Poussin, plague, and early modern medicine. *The Art Bulletin* 86(4):659–689. doi:10.2307/4134458
- Bin-Reza, F., V. Lopez Chavarrias, A. Nicoll, and M. E. Chamberland
 2012 The use of masks and respirators to prevent transmission of influenza: A systematic review of the scientific evidence. *Influenza and Other Respiratory Viruses* 6(4):257–267. doi:10.1111/j.1750-2659.2011.00307.x
- Birch de Aguilar, L.
 1996 Inscribing the Mask: Interpretation of Nyau Masks and Ritual Performance among the Chewa of Central Malawi. Sankt Augustin, Germany: Anthropos Institut.
- Biscotto, C. R., E. R. P. Pedroso, C. E. F. Starling, and V. R. Roth
 2005 Evaluation of N95 respirator use as a tuberculosis control measure in a resource-limited setting. *The International Journal of Tuberculosis and Lung Disease* 9(5):545–549.
- Blanchard, R.
 1900 Notes historiques sur la peste. *Archives de parasitologie* 3:589–646.
- Brienen, N. C. J., A. Timen, J. Wallinga, and P. F. M. Teunis
 2010 The effect of mask use on the spread of influenza during a pandemic. *Risk Analysis* 30(8):1210–1218. doi:10.1111/j.1539-6924.2010.01428.x
- British Medical Journal
 1898 How our forefathers fought the plague. *The British Medical Journal* 2(1969):903–908. doi:10.1136/bmj.2.1969.903
- Broquet, C.
 1911 Le masque dans la peste. Présentation d'un modèle de masque antipesteux. *Bulletin de la Société de Pathologie Exotique* 4:636–645.
- Buck-Morss, S.
 1977 The Origin of Negative Dialects: Theodor W. Adorno, Walter Benjamin, and the Frankfurt Institute. New York: The Free Press.
- Casanova, L. M., L. J. Teal, E. E. Sickbert-Bennett, D. J. Sexton, W. A. Rutala, and D. J. Weber; CDC Prevention Epicenters Program
 2016 Assessment of self-contamination during removal of personal protective equipment for Ebola patient care. *Infection Control & Hospital Epidemiology* 37(10):1156–1161. doi:10.1017/ice.2016.169
- Chuang, Y. C., Y. L. Huang, K. C. Tseng, C. H. Yen, and L.-H. Yang
 2015 Social capital and health-protective behavior intentions in an influenza pandemic. *PLOS One* 10(4): e0122970. doi:10.1371/journal.pone.0122970
- Clot-Bey, A. B.
 1840 De La peste observée en Egypte: Recherches et considérations sur cette maladie. Paris: Fortin Masson et Cie.
- Condon, B. J. and T. Sinha
 2010 Who is that masked person: The use of face masks on Mexico City public transportation during the Influenza A (H1N1) outbreak. *Health Policy* 95(1):50–56. doi:10.1016/j.healthpol.2009.11.009
- Cowling, B. J., Y. Zhou, D. K. Ip, G. M. Leung, and A. E. Aiello
 2010 Face masks to prevent transmission of influenza virus: A systematic review. *Epidemiology and Infection* 138(4):449–456. doi:10.1017/S0950268809991658
- Crawshaw, J. S.
 2017 The places and spaces of early modern quarantine. *In* Quarantine: Local and Global Histories. A. Bashford, ed. Pp. 15–34. London & New York: Palgrave Macmillan.
- Falk, F.
 2011 Eine gestische Geschichte der Grenze. Wie der Liberalismus an der Grenze an seine Grenzen kommt. Munich, Germany: Wilhelm Fink Verlag.
- Fang
 1912 Individual precautions taken by the medical staff during the recent epidemic at fuchiatien. *In* Report of the International Plague Conference Held at Mukden April 1911. R. P. Strong, ed. Pp. 287–289. Manila, The Philippines: Bureau of Printing.

- Ferng, Y. H., J. Wong-McLoughlin, A. Barrett, L. Currie, and E. Larson
 2010 Barriers to mask wearing for influenza-like illnesses among urban Hispanic households. *Public Health Nursing* 28(1):18–28.
- Fienup-Riordan, A.
 1996 *The Living Tradition of Yup'ik Masks: Agayuliyaraput (Our Way of Making Prayer)*. Seattle, WA: University of Washington Press.
- Frontisi-Ducroux, F.
 1995 *Du masque au visage. Aspects De L'identité En Grèce Ancienne*. Paris, France: Flammarion.
- Gamsa, M.
 2006 The epidemic of pneumonic plague in Manchuria 1910-1911. *Past & Present* 190(1):147–183. doi:[10.1093/pastj/gtj001](https://doi.org/10.1093/pastj/gtj001)
- Garrett, L.
 1994 *The Coming Plague: Newly Emerging Diseases in a World Out of Balance*. London: Penguin Books.
- Gell, A.
 1975 *Metamorphosis of the Cassowaries*. London: Athlone Press.
- Ginzburg, C.
 2017 *Fear Reverence Terror. Five Essays in Political Iconography*. Calcutta, London, New York: Seagull Books.
- Grigsby, D. G.
 1995 Rumour, contagion and colonization in Gros's plague-stricken of Jaffa (1804). *Representations* 51:1–46. doi:[10.1525/rep.1995.51.1.99p02872](https://doi.org/10.1525/rep.1995.51.1.99p02872)
- Harrison, M.
 2017 Pandemics. In *The Routledge History of Disease*. M. Jackson, ed. Pp. 129–146. London: Routledge.
- Hendrick, B. J.
 1914 Fighting “Black Death” in Manchuria. *The World's Work* 27:210–222.
- Hibbot, Y.
 1969 “Bonaparte Visiting the Plague-Stricken at Jaffa” by Antoine Jean Gros (1771-1835). *British Medical Journal* 1(5642):501–502.
- Hutin, J.-F.
 2012 La littérature médicale de la campagne d'Égypte. *Histoire des Sciences Médicales* xlv(1):19–30.
- Kapferer, B.
 2007 Anthropology and the dialectic of enlightenment: A discourse on the definition and ideals of a threatened discipline. *The Australian Journal of Anthropology* 18(1):41–62. doi:[10.1111/j.1835-9310.2007.tb00078.x](https://doi.org/10.1111/j.1835-9310.2007.tb00078.x)
- Kelly, C.
 2010 Medicine and the Egyptian campaign: The development of the military medical officer during the Napoleonic Wars c. 1798-1801. *Canadian Bulletin of Medical History* 27(2):321–342.
- Kinnear, E.
 1902 Propitiating the plague spirits. *The China Medical Missionary Journal* 264:204.
- Koji, W., O. E. Kuniko, and D. Smith
 2012 Wearing face masks in public during the influenza season may reflect other positive hygiene practices in Japan. *BMC Public Health* 12:1065. doi:[10.1186/1471-2458-12-1065](https://doi.org/10.1186/1471-2458-12-1065)
- La Rue, G. M.
 2016 Treating black deaths in Egypt: Clot-Bey, African slaves, and the plague epidemic of 1834-1835. In *Histories of Medicine and Healing in the Indian Ocean World, Volume Two, the Modern Period*. A. Winterbottom and F. Tesfaye, eds. Pp. 27–59. London & New York: Palgrave Macmillan.
- Lau, J. T., J. H. Kim, H. Y. Tsui, and S. Griffiths
 2008 Perceptions related to bird-to-human avian influenza, influenza vaccination, and use of face mask. *Infection* 36(5):434–443. doi:[10.1007/s15010-008-7277-y](https://doi.org/10.1007/s15010-008-7277-y)
- Lazarus, S.
 2013 Germ warfare: Hong Kong's never-ending fight against viruses. *Post Magazine*, December 1: 20–24.
- Lei, S. H.-L.
 2011 Sovereignty and the microscope: Constituting notifiable infectious disease and containing the Manchurian plague (1910–11). In *Health and Hygiene in Chinese East Asia: Policies and Publics in the Long Twentieth Century*. A. K. Ch Leung and C. Furth, eds. Pp. 73–106. Durham, NC: Duke University Press.
- Luckingham, B.
 1984 To mask or not to mask: A note on the 1918 Spanish influenza epidemic in Tucson. *The Journal of Arizona History* 25(2):191–204.
- Lynteris, C.
 2016 *Ethnographic Plague: Configuring Disease on the Chinese-Russian Frontier*. London: Palgrave Macmillan.
- Ma, X., Q. Liao, J. Yuan, Y. Liu, Y. Liu, J. Chen, J. Liu, et al.
 2014 Knowledge, attitudes and practices relating to Influenza A (H7N9) risk among live poultry traders in Guangzhou City, China. *BMC Infectious Diseases* 14:554. doi:[10.1186/s12879-014-0554-8](https://doi.org/10.1186/s12879-014-0554-8)

- MacIntyre, C. R., A. A. Chughtai, H. Seale, G. A. Richards, and P. M. Davidson
 2014 Respiratory protection for healthcare workers treating Ebola virus disease (EVD): Are facemasks sufficient to meet occupational health and safety obligations? *International Journal of Nursing Studies* 51:1421–1426. doi:10.1016/j.ijnurstu.2014.04.012
- MacIntyre, C. R., S. Cauchemez, D. E. Dwyer, H. Seale, P. Cheung, G. Browne, M. Fasher, et al.
 2009 Face mask use and control of respiratory virus transmission in households. *Emerging Infectious Diseases* 15 (2):233–241.
- Mooney, G.
 2015 *Intrusive Interventions: Public Health, Domestic Space, and Infectious Disease Surveillance in England 1840-1914*. New York: University of Rochester Press.
- Napier, A. D.
 1986 *Masks, Transformation, and Paradox*. Berkeley, CA: University of California Press.
- Nathan, C. F.
 1967 *Plague Prevention and Politics in Manchuria 1910-1931*. Cambridge, MA: Harvard East Asian Monographs.
- Oosten, J.
 1992 Representing The Spirits: The Masks Of The Alaskan Inuit. In *Anthropology, Art and Aesthetics*. J. Coote and A. Shelton, eds. Pp. 113–134. Oxford: Clarendon Press.
- Peckham, R.
 2016 Hong Kong junk: Plague and the economy of Chinese things. *Bulletin of the History of Medicine* 90(1):32–60. doi:10.1353/bhm.2016.0011
- Peckham, R.
 Forthcoming
 Plague Views: Epidemics, Photography, and the Ruined City. In *Plague and the City*. L. Engelmann, J. Henderson and C. Lynteris, eds. London and New York: Routledge.
- Platt, J. J., M. E. Jones, and A. K. Platt
 1998 *The Whitewash Brigade: The Hong Kong Plague of 1894*. London: Dix Noonan Webb.
- Pollock, D.
 1995 Masks and the semiotics of identity. *The Journal of the Royal Anthropological Institute (NS)* 1(3):581–597. doi:10.2307/3034576
- Redfield, P.
 2016 Fluid technologies: The Bush Pump, the LifeStraw® and microworlds of humanitarian design. *Social Studies of Science* 46(2):159–183. doi:10.1177/0306312715620061
- Reidy, R., T. Fletcher, C. Shieber, J. Shallcross, H. Towler, M. Ping, L. Kenworthy, et al.
 2017 Personal protective equipment solution for UK military medical personnel working in an Ebola virus disease treatment unit in Sierra Leone. *Journal of Hospital Infection* 96(1):42–48. doi:10.1016/j.jhin.2017.03.018
- Rogaski, R.
 2004 *Hygienic Modernity, Meaning of Health and Disease in Treaty-Port China*. Berkeley, CA: University of California Press.
- Russell, T. G. and T. M. Russell
 2003 Medicine in Egypt at the time of Napoleon Bonaparte. *British Medical Journal* 327(7429):1461–1464. doi:10.1136/bmj.327.7420.895
- Sin, M. S. Y.
 2016 Masking fears: SARS and the politics of public health in China. *Critical Public Health* 26(1):88–98. doi:10.1080/09581596.2014.923815
- Spooner, J. L.
 1967 History of surgical face masks. *AORN Journal* 5:76–80. doi:10.1016/S0001-2092(08)71359-0
- Strong, R. P., ed.
 1912 *Report of the International Plague Conference Held at Mukden April 1911*. Manila, The Philippines: Bureau of Printing.
- Summers, W. C.
 2012 *The Great Manchurian Plague of 1910-1911: The Geopolitics of an Epidemic Disease*. New Haven, CT: Yale University Press.
- Syed, Q., W. Sopwith, M. Regan, and M. Bellis
 2003 Behind the mask. Journey through an epidemic: Some observations of contrasting public health responses to SARS. *Journal of Epidemiology and Community Health* 57:855–856.
- Taussig, M.
 1989 History as commodity in some recent American (anthropological) literature. *Critique of Anthropology* 9 (1):7–23. doi:10.1177/0308275X8900900102
- The Lancet
 1927 The management of pneumonic plague epidemics. *The Lancet* 209(5403):611–612. doi:10.1016/S0140-6736(00)73375-7

Tomes, N.

- 2010 “Destroyer and Teacher”: Managing the masses during the 1918–1919 influenza pandemic. *Public Health Reports* 125(supp. 3):48–62. doi:[10.1177/00333549101250S308](https://doi.org/10.1177/00333549101250S308)

Tonkin, E.

- 1979 Masks and powers. *Manual (NS)* 14(2):237–248. doi:[10.2307/2801565](https://doi.org/10.2307/2801565)

Wald, P.

- 2008 *Contagious: Cultures, Carriers, and the Outbreak Narrative*. Durham, NC: Duke University Press.

Wu, L.-T.

- 1911 *Views of Harbin (Fuchiatien) Taken during the Plague Epidemic*. Shanghai: The Commercial Press, December 1910–March 1911.

-
- 1921 Practical points in the treatment of plague. *The Lancet* 198(5121):853–854. doi:[10.1016/S0140-6736\(00\)79708-X](https://doi.org/10.1016/S0140-6736(00)79708-X)

-
- 1926 *Treatise on Pneumonic Plague*. Geneva, Switzerland: League of Nations.

-
- 1959 *Plague Fighter, the Autobiography of a Modern Chinese Physician*. Cambridge, UK: W. Heffer & Sons.